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ENERGY $AVER$

"... For Business and Industry".

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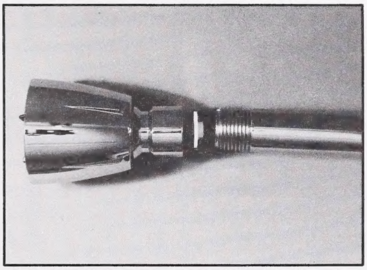
ENERGY SAVINGS CAN BE JUST A SPRAY AWAY

The Facts ...

Low-flow showerheads and flow restrictors are simple, inexpensive devices that can help prevent energy dollars from going down the drain.

Heating water can be costly when large volumes of water are used for showers. In most large buildings in Alberta there are opportunities to save on hot water heating costs. Reducing the volume with flow-controlling devices is one easy method.

Conventional showerheads in hotels, apartment buildings and recreation facilities generally use far more water than necessary. Installing a flow restrictor in a standard showerhead, or converting to a low-flow showerhead, will provide a quality shower while reducing hot water heating costs. Supply water and sewage costs may also be significantly reduced.



A flow restrictor inserted in a showerhead can reduce water flow by as much as 40 per cent.

Flow restrictors are washer-like devices which are inserted inside the threaded section at the showerhead connection. Depending on the size of the opening, flow restrictors can reduce shower water flow by as much as 40 per cent.

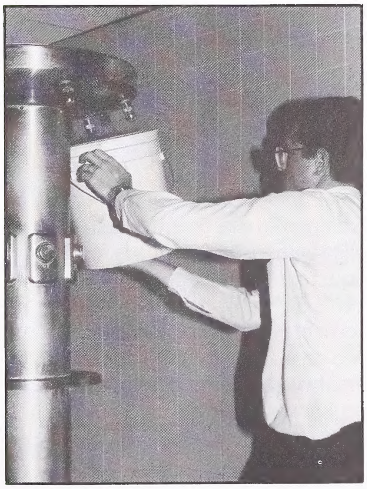
Low-flow showerheads are designed to perform effectively with lower than normal flow rates. The effect of using low-flow showerheads is higher water velocity with a fine spray pattern. Some low-flow showerheads are adjustable for an intense needle spray or a soft, rain-like spray.

Better-designed showerheads usually have the following features: resistance to corrosion and plugging, uniform spray patterns, ease of adjustment and a pleasing appearance. A good selection of low-flow showerheads is available in the $5 to $30 range.

Tests have shown that using low-flow showerheads can reduce water heating costs by an average of 46 per cent. The savings for one 10-minute shower per day can be up to $11.00 per year. These savings are based on a 3.5 imperial gallons per minute (GPM) or 15.9 litres per minute (L/min) flow rate for conventional showerheads, a 1.9 GPM (8.64 L/min) flow rate for low-flow showerheads, and a natural gas utility rate of $2.43 per gigajoule.

Reducing the amount of water used for showers generally results in savings in annual water and sewage charges that are comparable to those for hot water heating. The combined annual savings can result in a payback period of less than a year.

It is important that owners or managers of apartments, hotels and similar buildings consider user satisfaction. Some people may not be willing to sacrifice what they consider to be a quality shower for the energy savings resulting from reduced flow. Therefore, managers may have to reinstall the old showerhead or remove the flow restrictor for a few people. An effective way to identify an acceptable flow control device is to do some user testing prior to the large purchase for the whole building.



An energy technologist tests the flow rate of a standard showerhead used in a recreation facility.

Flow restrictors are a low-cost, easily implemented conservation measure and can be user tested. Managers can install flow restrictors as the first step. If they are not satisfied with the flow restrictors, different models of low-flow showerheads can be tried. After finding the acceptable flow control device, managers could change all showerheads at the same time, or change them as tenants move out. Those who have done so report less resistance to flow-reducing showerheads if tenants are not faced with an abrupt change from their accustomed showerhead.

There are other ways to reduce shower water use. Users can adjust taps to maintain the shower at a lower flow rate. Some showerheads are equipped with shut-off and throttling valves which allow the user to reduce water flow during soap-up periods. However, their effectiveness depends on the user who may not want to use them. Showers with timed shut-off valves are useful in recreation facilities where users sometimes leave showers running.

Generally far more hot water goes down the drain every day in Alberta than is necessary. Installation of flow restrictors or low-flow showerheads can give building owners and managers some control over shower water use. This can lead to large savings in hot water heating costs as well as significant reductions in water and sewage charges.

The Application ...

The Ponoka Culture and Recreation Complex is a large, multi-purpose facility with a 69 360 square foot (6444 square metres) floor area, built in 1977. Owned and operated by the Town of Ponoka, the complex houses two hockey rinks, six sheets of curling ice, two racquetball courts and arts and crafts rooms.

To obtain help in developing a program to reduce energy use, and thus reduce operating costs, staff requested a visit by Alberta's Energy Bus, a mobile energy audit service.

The Ponoka Culture and Recreation Complex houses two hockey rinks, six sheets of curling ice, two racquetball courts and arts and crafts rooms.

The audit team assessed energy use throughout the complex and suggested several ways to reduce it. One suggestion was to reduce the flow rate of showers in the hockey and racquetball dressing rooms.

Les Oberst, the facility's equipment operator, had low-flow showerheads installed in eight of 12 showers soon after the energy audit. Since the change-over Oberst has experienced no maintenance problems with the low-flow showerheads and user satisfaction has been high.

Low-flow showerheads installed in the Ponoka Culture and Recreation Complex save about $113 in hot water heating costs annually.

A follow-up check on the results of the Energy Bus audit shower recommendations was made in June 1988. The average flow rate of the eight low-flow showerheads was 2.05 GPM (9.32 L/min). The four showerheads that were not changed had flow rates ranging from 2.76 to 5.33 GPM (12.55 to 24.23 L/min).

The eight low-flow showerheads cost $98.80 ($12.35 each). Installation costs were negligible and considered part of normal maintenance. Based on typical multiple daily shower use patterns provided by Oberst, it was determined that the new showerheads save 70 000 gallons (318 220 litres) of water a year or about $113 in hot water heating costs annually.

In addition, the Town of Ponoka now saves about $109 in supply water and sewage costs, for a total savings of $222 per year ($27.75 per showerhead). This means that with a payback period of just over five months ($98.80/$222 × 12 months = 5.34 months), the low-flow showerheads were a good investment.

The fast payback period for recreation facilities is possible because there are multiple users per showerhead in facilities like swimming pools and arenas.

The Bottom Line . . .

For most owners or managers of apartment buildings, condominiums or hotels, reducing shower water use can be inexpensive and simple. Even for showers used only once a day, a change-over to flow restrictors or low-flow showerheads is a worthwhile energy conservation measure with a payback period of one or two years.

The installation cost of flow-reducing devices is minimal as skilled tradesmen are not required. The change-over can be done by most maintenance staff when convenient.

Figure 1 and the technique described below can be used to check potential hot water heating cost savings per showerhead. Savings are based on the following:

- one 10-minute shower per day per year
- 3.5 GPM (15.9 L/min) for a conventional showerhead
- 1.9 GPM (8.64 L/min) for a low-flow showerhead
- 2.49 GPM (11.32 L/min) for a showerhead with a flow restrictor
- 75 per cent hot water heating plant efficiency.

Contact your local gas utility company to obtain your facility's natural gas rate. To use the graph, select the gas rate along the bottom that corresponds to your utility rate. Then, read up to the intersection point on the appropriate line (flow restrictor or low-flow showerhead) and across to the left for the annual dollar savings. A typical natural gas rate of $2.43/GJ (gigajoule) is plotted as an example on the graph.

Figure 2 shows potential water and sewage cost savings per showerhead, based on the same flow rates and shower duration as was used for Figure 1. To use the graph, first determine the applicable water and sewage charge for your facility. Then locate the point on the horizontal axis that corresponds to that charge. Reading up, as in Figure 1, and across to the vertical scale will give the annual savings for water and sewage. A typical water and sewage charge of $1.00/m³ (cubic metre) is shown as an example.

An example calculation of potential cost savings for hot water heating and water and sewage using a low-flow showerhead is as follows:

Potential Hot Water Heating Cost Savings For Low-Flow Showerheads

Natural gas rate = $2.43/ GJ
Showerhead flow rate = 1.9 GPM (8.64 L/min)
One 10-minute shower/day
Savings per showerhead = $11.00 per year

Potential Water and Sewage Cost Savings For Low-Flow Showerheads

Water and sewage charge = $1.00/m³
Showerhead flow rate = 1.9 GPM (8.64 L/min)
One 10-minute shower/day
Savings per showerhead = $28.00 per year

Total annual savings per showerhead = $39.00

FIGURE 1

NATURAL GAS COST SAVINGS FROM REDUCED SHOWER WATER FLOW RATE

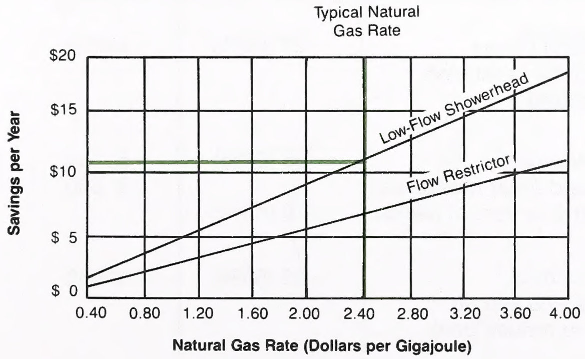
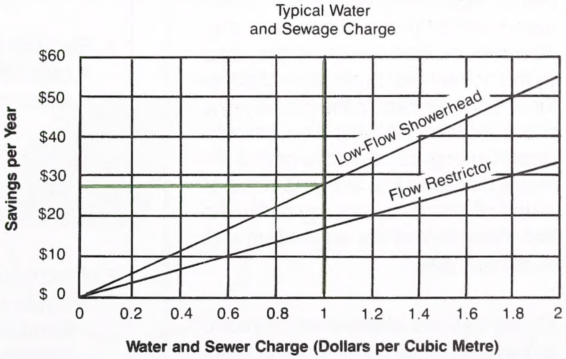


FIGURE 2

WATER AND SEWER SAVINGS FROM REDUCED SHOWER WATER FLOW RATE



SECTOR REVIEW

Savings Potential in the Hotel/Motel Business

Energy use varies widely, depending on the type of building and the activities in that building. The variety in energy use has become evident following Energy Bus audits of almost every type of facility in Alberta.

An energy audit determines initially how energy is being used and how much it costs in each area. Energy conservation measures are then identified which may result in energy cost savings. On average, the Energy Bus has identified a potential reduction in energy costs of about 20 per cent.

Energy audits of 40 hotels/motels in Alberta have identified the potential for lowering energy costs in the hotel/motel business. The audits showed that these hotel and motel owners or managers have the potential to save, on average, $19 000 a year by implementing energy conservation measures. These savings represent 19.6 per cent of the total energy costs. In the hotels/motels audited, annual energy bills ranged from $7000 to $400 000. The average yearly energy cost was about $100 000.

Figure 3 shows energy use in kilowatt hours per square foot (and per square metre) per year and cost for natural gas and electricity in the audited hotels/motels. Natural gas use is highest — 76 per cent compared with 24 per cent for electricity. However, the cost of natural gas used by the hotel/motel business accounts for only 41 per cent of the total energy costs for this industry. The percentage of energy used and its cost is different because the average price of a unit of electrical energy is four to five times that of the equivalent unit of natural gas.

Figure 4 shows where energy is used in the hotel/motel business. Hot water heating for showers accounts for most of the 6.1 per cent of natural gas used for heating water.

For the hotel/motel business, there are many opportunities to save on energy costs. Alberta Energy Bus audits found that potential energy cost savings ranged from $300 to over $100 000 per year. Only 30 per cent of the identified energy dollar savings required conservation measures needing capital cost investments.

Most of the identified savings were generated by no-cost or low-cost conservation measures, which could be covered by operating and maintenance budgets. Many of these conservation measures involve changing a control point setting or making small changes in the normal operating and maintenance procedures of a facility.

Table 1 shows five simple conservation measures that are no-cost or low-cost. These energy saving methods account for 86 per cent of the identified savings.

Of the 40 energy audits conducted for the motel/hotel industry, 18 identified good savings in hot water heating costs by installing shower flow control devices. The average potential savings from the use of flow restrictors or low-flow showerheads are $830 per year.

TABLE 1

Suggested Conservation Measure	Number of Times Recommended	Average Annual Savings per Suggestion
1. Lighting Revision • change to energy-efficient tube/bulbs • improve lighting control • review lighting needs	39 (98%)	$3700
2. Reduce building skin losses • set back thermostats where appropriate • improve and maintain weatherstripping	37 (92%)	$2500
3. Reduce ventilation losses • turn off or reduce ventilation when not required	27 (68%)	$5800
4. Reduce hot water cost • pool covers and other measures • install shower flow control device	25 (63%) 18 (45%)	$1100 $ 830
5. Electrical load control • Cycle car plug-ins and air conditioning to reduce peak demand	22 (55%)	$1860

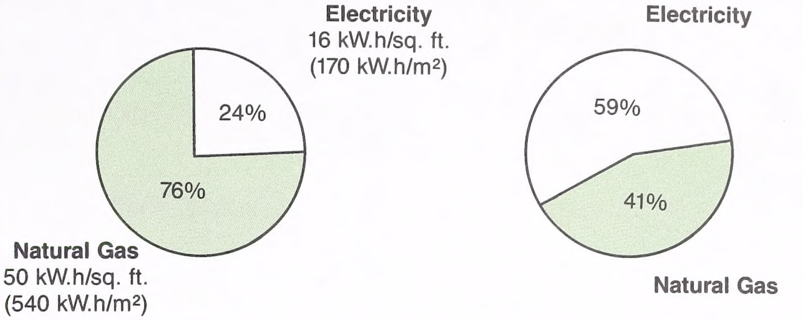
Installation of flow restrictors is simple. With a cost of less than a dollar for the least expensive types, flow restrictors are a low-cost measure with a short payback period. Depending on the water pressure at the showerhead, flow restrictors may reduce water flow up to 40 per cent. This can result in significant savings in hot water heating costs as indicated in Figure 5.

Reducing the rate of water flow with low-flow showerheads may cost between $5 to $30 per showerhead initially, but can result in about 28 per cent savings in hot water heating costs, while still producing a quality shower. For both flow restrictors and low-flow showerheads, the associated savings in supply water and sewage costs can frequently amount to the same as the savings in hot water heating costs, or more.

Installing flow restrictors in conventional showerheads, or changing to low-flow showerheads are two low-cost, easily implemented measures that can help the hotel/motel business to realize good energy cost savings.

FIGURE 3

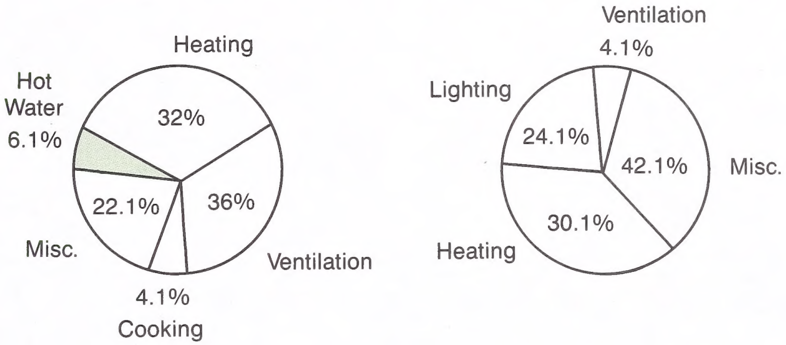
HOTELS AND MOTELS ENERGY USE AND COST



Energy Use **Energy Cost**

FIGURE 4

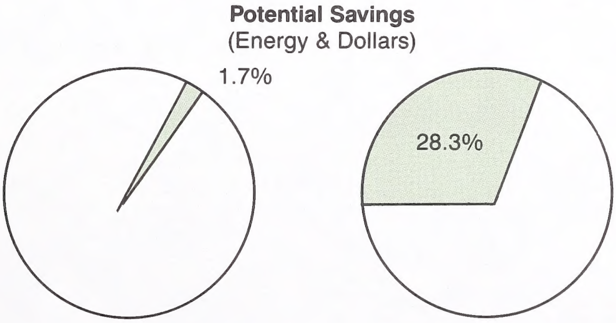
ENERGY USE ANALYSIS FOR HOTELS AND MOTELS



Natural Gas **Electricity**

FIGURE 5

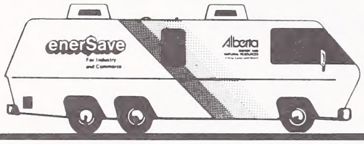
HOT WATER SAVINGS POTENTIAL Due to Low-Flow Shower Devices



Total Natural Gas Usage **Natural Gas Use for Hot Water**

FOR MORE INFORMATION

The article Energy Savings Can Be Just A Spray Away was researched by David Supruniuk, and the Sector Review was completed by Les Sladen. For more detailed information on energy cost savings calculations and the energy audit database, contact the industrial section of the Energy Conservation Branch: Phone 427-5200 (collect).



ENERGY $AVER$

Energy $aver$ is a series of fact sheets about energy conservation measures that have wide application in Alberta. Each issue highlights a different technology and its successful use in the province. The Sector Review summarizes energy use patterns of different facilities that have used Alberta's Energy Bus audit service. Comments, questions, and suggestions are welcome.

Write or phone (collect) to be placed on the mailing list. You may also receive back issues or arrange for an Energy Bus audit (conducted at no charge).

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